

Comparison of global visual field indices (MD,VFI), GPA II change and cluster analysis of visual field progression in glaucoma

Valeria Bono; Benjamin M Davis; Eduardo Maria Normando; Laura Crawley; Faisal Ahmed; Cillino Salvatore; Philip Bloom; M Francesca Cordeiro

— Author Affiliations & Notes

Valeria Bono

UCL Institute of Ophthalmology, London, United Kingdom

Experimental Biomedicine and Clinical Neuroscience, Ophthalmology Section, University of Palermo, Palermo, Italy

Benjamin M Davis

UCL Institute of Ophthalmology, London, United Kingdom

Eduardo Maria Normando

UCL Institute of Ophthalmology, London, United Kingdom

Glaucoma unit, Western Eye Hospital, London, United Kingdom

Laura Crawley

Glaucoma unit, Western Eye Hospital, London, United Kingdom

Faisal Ahmed

Glaucoma unit, Western Eye Hospital, London, United Kingdom

Cillino Salvatore

Experimental Biomedicine and Clinical Neuroscience, Ophthalmology Section, University of Palermo, Palermo, Italy

Philip Bloom

Glaucoma unit, Western Eye Hospital, London, United Kingdom

M Francesca Cordeiro

UCL Institute of Ophthalmology, London, United Kingdom

Glaucoma unit, Western Eye Hospital, London, United Kingdom

Footnotes

Commercial RelationshipsValeria Bono, None; Benjamin Davis, None; Eduardo Normando, None; Laura Crawley, None; Faisal Ahmed, None; Cillino Salvatore, None; Philip Bloom, None; M Francesca Cordeiro, None

SupportNone

Abstract

Purpose

Global visual field indices, such as Mean Deviation (MD) and Visual Field Index (VFI) are commonly used to evaluate glaucoma progression, along with Guided Progression Analysis (GPA). Recently, linear regression analysis of average threshold sensitivity in visual field clusters has been advocated as potentially being valuable in identifying early progression. This study aimed to compare all these methods.

Methods

62 eyes from OHT and glaucoma patients with a minimum of 5 reliable visual field tests (HFA II i 24-2) and a follow-up >4 years were analyzed retrospectively. GPA progression was assessed by the difference in the number of solid triangles between the reliable last and first tests at the same point location (GPA C). MD and VFI rates of progression were used for trend analysis. Linear regression of clusters defined by the Glaucoma Hemifield Test (GHT) was performed based on the mean threshold in each cluster. Global and clustered rates of VF change were flagged as statistically significant progression if the gradients over time were negative with $p < 0.05$.

Results

The median number (\pm SD) of VFs was 8.66 (\pm 3.34) over a period 9.28 (\pm 2.93) years. MD, VFI and GPA C classified 20 (32%) 24 (39%) and 33 eyes (53%) as stable, respectively. Mean rates of progression of MD and VFI were -0.46 dB (\pm 0.34) and -0.91% (\pm 0.78) per year, respectively ($\rho=0.77$; $p < 0.0001$) with good agreement ($k=0.72$). 26 eyes (42%) showed progression in both MD and GPA C, whereas 25 (40%) showed progression in both VFI and GPA C. Agreement between MD and VFI trend analyses and GPA C was $k=0.40$ and 0.46 , respectively. GHT cluster analysis was performed on MD and GPA C stable eyes and showed greater progression (clusters ≥ 1) than both GPA C (40% compared to 15%) and MD (67% compared to 48.5%) with poor and moderate agreement ($k=-0.05$ and 0.52 , respectively).

Conclusions

MD and VFI analyses performed similarly in determining rate of glaucoma progression and with moderate agreement with event-based GPA. GHT cluster trend analyses showed poor agreement with GPA C in MD-defined stable patients. The cluster analysis appeared to detect more progression than either MD or GPA C and may strongly suggest that it may be a more sensitive method than global indices for the early identification of glaucomatous visual field loss.

	Stable		Progressive	
	<i>Number</i>	<i>(%)</i>	<i>Number</i>	<i>(%)</i>
MD	20	(32%)	42	(68%)
VFI	24	(39%)	38	(61%)
GPA C	33	(53%)	29	(47%)

	MD stable		GPA C stable	
	GHT cluster	GPA C	GHT cluster	MD
Progressive	40% (8)	15% (3)	67% (22)	48.5% (16)
Stable	60% (12)	85% (17)	33% (11)	51.5% (17)

[View Original](#) [Download Slide](#)

Tables comparing stable and progressive patients using different indicators

Keywords: 758 visual fields • 468 clinical research methodology • 531 ganglion cells

© 2014, The Association for Research in Vision and Ophthalmology, Inc., all rights reserved. Permission to republish any abstract or part of an abstract in any form must be obtained in writing from the ARVO Office prior to publication.